INTERNATIONAL SOLDIER SYSTEMS CONFERENCE AND EXHIBITION 2004

Infantry Warrior Simulation (IWARS)

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The Science Behind the Warrior:

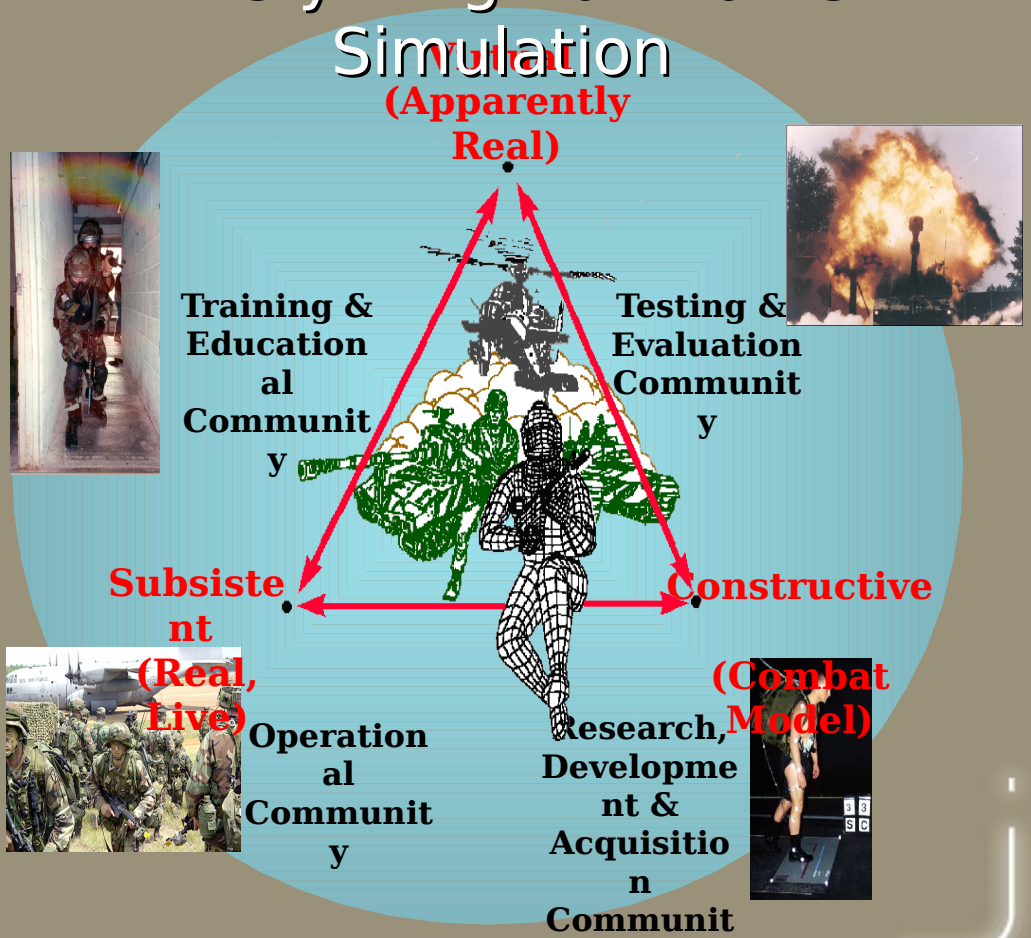
Yesterday, Today and

A Little History

- Long-standing desire in the Army modeling and simulation community to have accredited constructive simulation representing dismounted warriors
- Natick Soldier Center (NSC) and Army Materiel Systems Analysis Activity (AMSAA) pursued development of infantry combat simulations, Integrated Unit Simulation System (IUSS) and AMSAA Infantry MOUT Simulation (AIMS), respectively
- In 2003, NSC and AMSAA agreed to collaboratively develop a constructive model to meet both agencies' needs
- The new model is the Infantry Warrior Simulation (IWARS)
- In 2004, NSC and AMSAA signed a Memorandum of Agreement for this joint effort

Operations Research

Operations Research analyses, supported by modeling and simulation (exercises, training, operations, planning), provide the only peacetime capability to develop requirements, explore doctrine, and assess soldier systems' performance -- examining the full



Joint NSC/AMSAA Vision

Demonstrated excellence in Warrior Systems Modeling and Analysis through continuous development, maintenance, and application of a comprehensive analytic infrastructure:

- **Models and Simulations**
- **Scenarios**
- **Data**

→ Soldier Solutions!

Philosophy

Customers' decision making requirements will drive all planned efforts

CUSTOMER S' NEEDS

REQUIRED ANALYSES

Responsive to Customer Needs

METHODOLOGY INFRASTRUCTURE: TOOLS AND DATA

Critical core capability

What is IWARS? A Brief Description

- **IWARS is…**
  - Analysis driven
  - Agent-based
  - Multi-sided
  - Force-on-force simulation
  - Focused on individual and small-unit dismounted combatants and their equipment
  - Used to assess operational effectiveness across spectrum of missions, environments and threats

The Army Requires an Expanded Small Unit Combat Simulatio Capabilities to Address Integrated "Soldier-as-a-System" Issu

IWARS Development

AMSAA

- Standard physical algorithms
- Certified weapon performance/ characteristics database
- Soldier behavior representation, algorithms, descriptions and data
- VV&A experience
- Simulation development

Natick

- Physiological methodology and data
- Cognitive/physical behavior integration
- Autonomous agent technology
- Lead for related efforts (MATREX, FACTs, TTCP, SBIRs, STOs)
- Simulation development (including architectural structure)

AMSAA/Natick Collaboration

Infantry Warrior Simulation

TRADOC

- Model development
- Military expertise
- Scenario development
- TTP (behavior) development

Other efforts and organizations

- Model development
- FACTs / SBIRs
- M&S/STOs
- Intl / TTCP

We are leveraging each organization's key competencies and multiple sources of external expertise

Joint NSC/AMSAA M&S Requirements

Scenarios

- User-defined tasks and missions in:
  - Open area
  - Urban area
  - Inside buildings

Force Structures

- User defines organization, equipment and capabilities of
  - Individual soldiers
  - Units
  - Non-combatants

Software

- Flexible
  - Plug & Play components
  - Ease of modifications

Physical Representations

- Standard algorithms where appropriate
- Leverage ongoing efforts (FACTs, STOs, etc.)

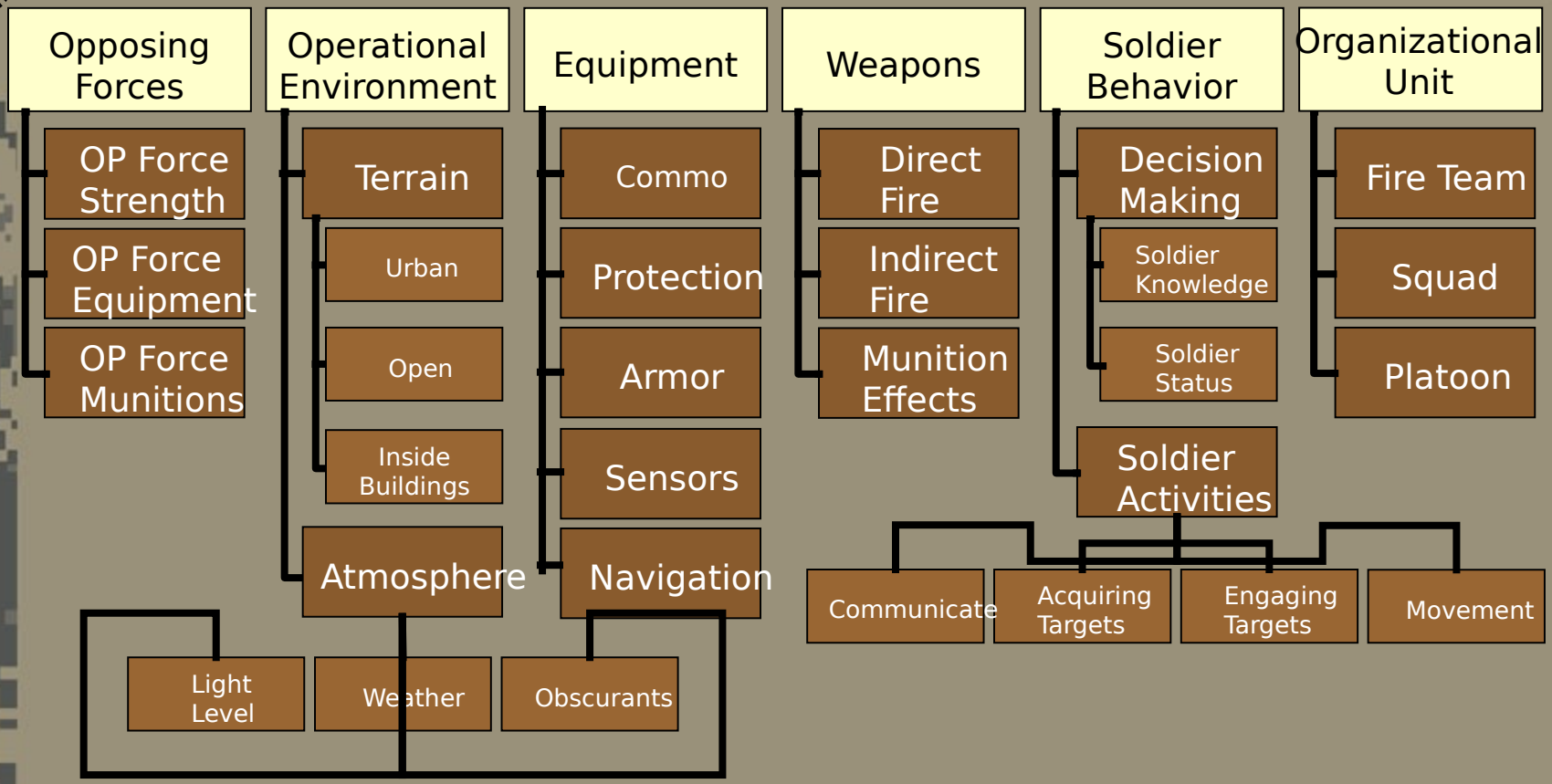
Behaviors

- Soldiers react dynamically to situation
  - Decisions based on available information
  - Derived from Army FMs & SMEs

Analysis Capabilities

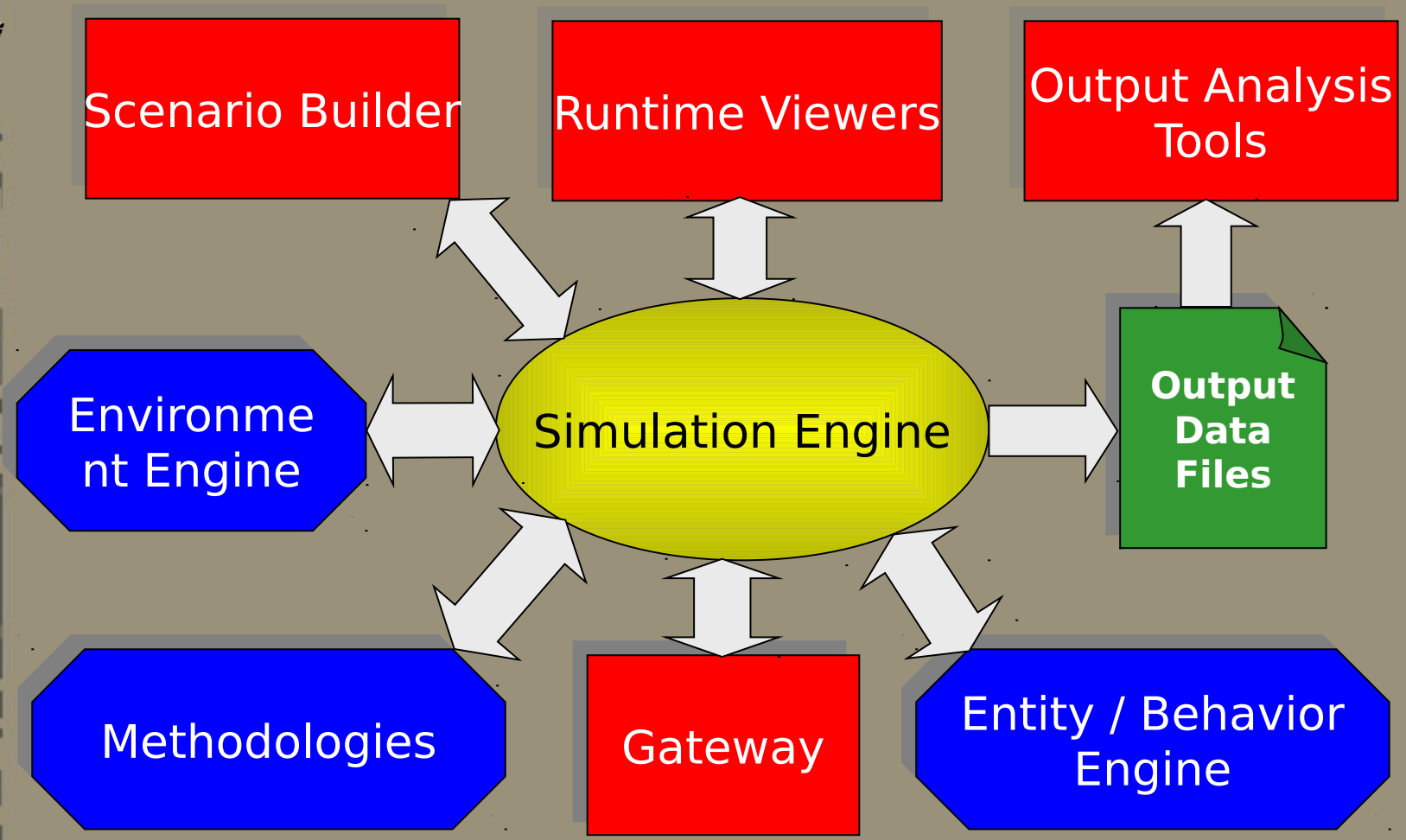
- User-defined output
- Standard MOEs & MOPs
- User-defined MOEs & MOPs
- User-definable post processing

IWARS Needed Representations



Representations Consist of Methodology, Data and Behavior

Planned IWARS Components



IWARS Uses

1. Stand-Alone Soldier Analysis

IWARS → System/Component Benefits (RDA)

IWARS → Analysis of Alternatives (AoAs) (ACR)

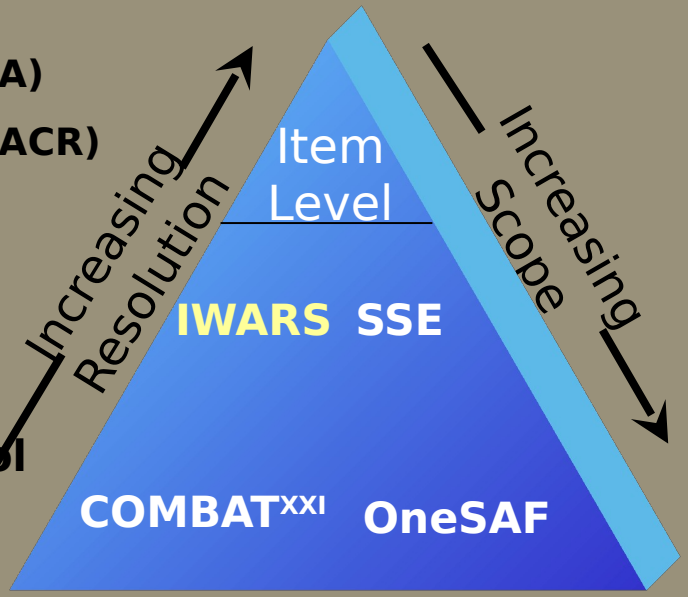
2. Soldier/Small Unit Federation

COMBAT^{XXI} ↔ IWARS

OneSAF

MATREX

3. Complementary Soldier Analysis Tool

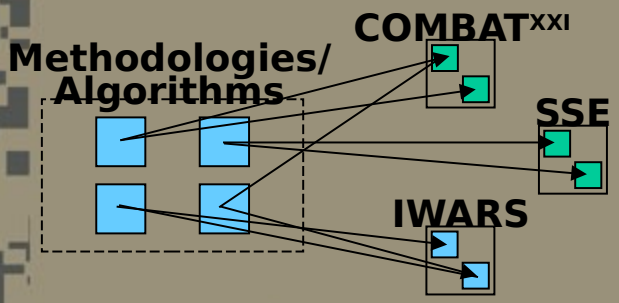


OneSAF

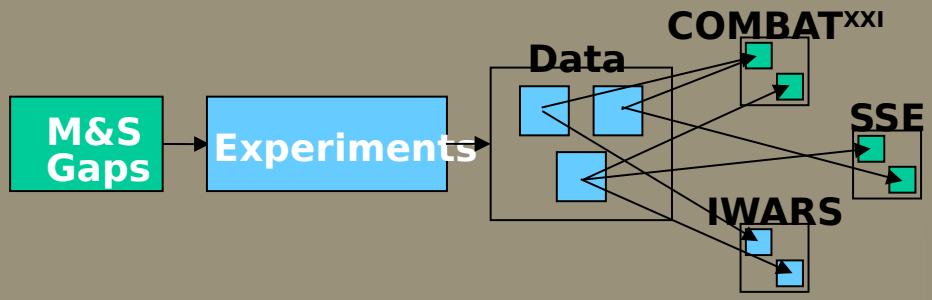
SSE

Operational Output → IWARS → Statistical Confidence

4. Soldier Simulation Testbed



5. Soldier Field Tests / Data



Analytic Applications: Products and Value

PRODUCTS

- Combat Worth Assessments
- Systems Integration Analyses
- Program Investment Decisions
- Milestone Decision Support
- Basis of Issue Determination
- System Down Selection
- Front End Analyses
- Analyses of Alternatives
- Risk Reduction Analyses
- Performance/Cost Trade Analyses
- Constructive Modeling
- M&S Tool Development

VALUE

- Provide necessary inputs for quantitative and qualitative evaluations
- Support higher level management decision making
- Provide unbiased assessments to project managers
- Assess alternative concepts and technologies
- Support down selection process
- Facilitate evaluations not possible with human subjects

Summary

- AMSAA & Natick are jointly working to produce a Soldier combat simulation for potential use throughout the Army analytical community
- This work promises significant dividends to warrior systems Research Development and Acquisition (RDA), Advanced Concepts and Requirements (ACR) and Training, Exercises, and Military Operations (TEMO)
- There is a good deal of challenging work
- We have built the core architecture and are now adding functionality
- Release version 1.0 is due September 2005
- IWARS supports the Army's

IWARS Will Provide the Army an Analysis Tool to Address Current Shortfalls in Soldier Analysis Capabilities